MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

DCT5038 – DATA COMMUNICATIONS AND NETWORKING

(DIT & DBIS)

24 OCTOBER 2017
2.30 PM- 4.30 PM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **TWO (2)** pages.
2. Answer **ALL FIVE (5)** questions.
3. Write all your answers in the **Answer Booklet** provided.

Instruction: *Answer **ALL** the questions in this section and write your answers in the answer booklet provided.*

QUESTION 1 **(20 Marks)**

a) Give definition for terms below:
   i. Data. (2 Marks)
   ii. Data Communication. (2 Marks)

b) Draw **TWO (2)** different network topologies that consist of **SIX (6)** stations for each topology. (6 Marks)

c) Give **ONE (1)** advantage and **ONE (1)** disadvantage for each topology in 1(b). (4 Marks)

d) Define the function and type of data in Open System Interconnection (OSI) layer for layer A, B and C. (6 Marks)

Application Layer
Presentation Layer
Session Layer
A
B
C
Physical Layer

QUESTION 2 **(20 Marks)**

a) Draw a sine wave that has same amplitude but with degree of phase as below:
   i. 90 degrees. (3marks)
   ii. 180 degrees. (3marks)

b) A device is sending a data at a rate of 1000 bps.
   i. Calculate a bit interval. (2 Marks)
   ii. How long does it take to send 50 bits? (2 Marks)

c) Assume that a voice channel occupy a bandwidth of 4 kHz. We need to multiplex 9 voice channels with guard bands of 500 Hz using FDM. Calculate the required bandwidth. (2 marks)

d) Assume multiple slot Time-division Multiplexing (with no synchronizing bits) is used to combine 5 sources, consist of 2 sources with a bit rate of 25kbps and 3 sources with a bit rate of 50 kbps.
   i. What is the size of a frame in bits? (2 marks)
   ii. What is the frame rate? (2 marks)
   iii. What is the duration of a frame? (2 marks)
   iv. What is the data rate? (2 marks)

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QUESTION 3 (20 Marks)

a) Briefly explain about Multimode Grade Index in Fiber Optic Cable Propagation Mode. (4 Marks)

b) Draw the propagation in 3(a). Show the propagation of light from sources to destination. (5 Marks)

c) Given the codeword 110010001 and the divisor 1100, use the CRC method to determine whether the codeword is free for error. (6 Marks)

d) Give an example (send and receive bits) that can describe usage of Simple Parity Check. (5 Marks)

QUESTION 4 (20 Marks)

a) Show the Go Back-N ARQ in the following situation with diagram.
   i. Normal operation. (4 Marks)
   ii. The frame is lost. (4 Marks)

b) List **THREE (3)** types of frame in High-level Data Link Control (HDLC). State the number of field in each frame. (6 Marks)

c) Draw the Token Passing in:
   i. Star Ring. (3 Marks)
   ii. Dual Ring. (3 Marks)

QUESTION 5 (20 Marks)

a) List any **THREE (3)** physical implementation of Gigabit Ethernet. State the types of cable and maximum length (segment) of each implementation. (6 marks)

b) Briefly explain Basic Service Sets (BSS) of 802.11 LANs for the following network:
   i. Ad Hoc Networks. (3 marks)
   ii. Infrastructure Networks. (3 marks)

c) Draw a Local Area Network (LAN) design, which connects to **ALL** the following buildings. (8 marks)
   i. Building A: Ground floor.
      : Consist of core switch.
   ii. Building B: Ground floor and 3 upper floor.
      : Consist of distribution and access type switch.
   iii. Building C: Ground floor and 3 upper floor.
      : Consist of distribution and access type switch.

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